

axis. In some cases the forward movement was found to be at the rate of 0.7<sup>mm</sup> per second. MIYAKE agrees with WEBBER that the liquid in the archegonial chamber at the time of fertilization comes from the pollen tube and not from the archegonium.—CHARLES J. CHAMBERLAIN.

**Heterostyly and gynodioecism.**—Inheritance of dimorphism has been investigated by RAUNKIÄR<sup>37</sup> in *Primula*, *Menyanthes*, *Pulmonaria*, *Fagopyrum*, *Knautia*, and *Thymus*. In all heterostylic species studied he finds that the long-styled and short-styled forms occur in about equal numbers regardless of the character of the environment. In gynodioecious species, on the other hand, he finds considerable variation in the proportions of the two forms in different localities. The results of breeding are in close accord with those of CORRENS,<sup>38</sup> except in an interesting case in which a cross between two bisporangiate plants of *Thymus vulgaris* produced 65 per cent. pistillate plants. In *Primula officinalis*, brachystylic plants pollinated by brachystylic produced 62.5 per cent. brachystylic, brachystylic × dolichostylic gave 55.2 per cent. brachystylic, and dolichostylic × dolichostylic only 4.3 per cent. brachystylic. Investigation covering several generations is needed to determine the effects of the pre-parental ancestry, and until this is done, any speculation as to the hereditary nature of the forms of a dimorphic species can be of little value.—GEORGE H. SHULL.

**Development of spores of Helminthostachys.**—BEER<sup>39</sup> has investigated the development of the spores of *H. zeylanica*, his material being fertile spikes preserved in spirit. CARDIFF,<sup>40</sup> and afterwards STEVENS,<sup>41</sup> had described the peculiar blocking out of the sporogenous tissue and the remarkable behavior of the plasmodium-like tapetal cytoplasm in *Botrychium*; and BEER finds the same phenomena in *Helminthostachys*. His observations extend, however, to the specific work of the tapetal plasmodium in spore-formation. The observed facts are that during the period of exospore growth the tapetal plasmodium shows more or less complete disappearance of starch, gradual diminution of the finely vacuolar cytoplasm, and richly chromatic nuclei which often show irregularities of outline. The conclusion is that the tapetal plasmodium is the center of metabolic activities in which a substance is elaborated from the raw materials contained in the tapetum, and is employed, directly or indirectly, in the growth of the spore wall.—J. M. C.

<sup>37</sup> RAUNKIÄR, C., Sur la transmission par hérédité dans les espèces hétéromorphes. Bull. Acad. Roy. Sci. et Let., Denmark, pp. 31-39, 1906.

<sup>38</sup> See BOT. GAZETTE 39: 304. 1905. and 41: 302. 1906.

<sup>39</sup> BEER, RUDOLF, On the development of the spores of *Helminthostachys zeylanica*. Annals of Botany 20:177-186. pls. 11-12. 1906.

<sup>40</sup> BOT. GAZETTE 29:340-347. pl. 9. 1905.

<sup>41</sup> Annals of Botany 19:—, —, 1905.